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HAIR COLORANTS

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[There are no amendments to the patent.]

Claims

1. Hair colorants, characterized by negatively charging a pigment that is not harmful or that [is only] slightly harmful to the human body and stored in an apparatus to propel it onto a human head.

2. Hair colorants according to Claim 1, characterized in that the pigment consists of particles with particle sized 0.1-10 μm.

3. Hair colorants according to Claim 1, characterized in that the apparatus is equipped with a circuit for supplying a uniform amount of electricity.

4. Hair colorants according to Claim 1, characterized in that the apparatus is equipped with a circuit for supplying a constant current.

5. Hair colorants according to Claim 3 or 4, characterized in that the apparatus is equipped with a probe-electrode-containing handgun as a propelling port.

Detailed explanation of the invention

The present invention pertains to hair colorants. More precisely, it pertains to colorants using a novel method for dyeing hair utilizing static electricity.

The beauty of hair is an important factor for determining a person's grace, therefore hair dyeing has been conducted since ancient times, however, in recent years, hair dyeing as a fashion has been conducted among people of all ages and both sexes. Heretofore, various ethods have been developed for that purpose, for example, (a) a dye is dissolved in a suitable solvent and the

dye solution is coated on hair using a brush, (b) a rod crayon-shaped dye is dissolved little by little in a solvent such as water and then the solution is coated on hair, and (c) spray dyeing, which has been carried out recently. In (c), an oil-soluble dye is mixed with an oil-soluble solvent, such as hexane and resins, and then the mixture is sealed with Freon gas or nitrogen gas in a pressure-resistant vessel, such as an aluminum vessel, or a water-soluble dye is mixed with an alcohol-based solvent and resins and then the mixture is sealed with a liquefied gas or compressed gas in a pressure-resistant vessel, such as an aluminum vessel, and then the aluminum vessel is used for hair dyeing.

However, in methods (a) and (b), it is necessary to dissolve a dye in a solvent such as water, so it is troublesome, and it is very difficult to coat uniformly the hair at the back of the head, and it takes a long time to dye all the hair.

When method (c) is used, the hair cannot be dyed uniformly by the colorant so spots are formed; a large amount of the colorant is sprayed so that the hair becomes bulky, and the person who dyed his/her hair has a feeling of physical discomfort.

The cuticle at the hair surface has the shape of many scaly layers like roofing tiles; therefore, even when the above-mentioned methods (a), (b), and (c) are used to coat and spray the hair, air layers are formed between the hair and the colorant, and after drying, when the hair is bent or stress is applies to the hair, the dye easily comes off, and it is difficult to comb the hair, thus the original beauty of hair is lost.

In view of these circumstances, the present inventor conducted extensive studies on dyeing hair. As a result, he used static electricity in dyeing hair, which was completely different from conventional methods, and thus he completed the present invention.

Namely, the objective of the present invention is to provide hair colorants using a dyeing method that has none of the above-mentioned drawbacks. Such objective can be attained by using a hair colorant characterized by negatively charging a pigment that is not harmful or that [is only] slightly harmful to the human body and is stored in an apparatus for squirting onto the human head.

In the following, the present invention will be explained in detail.

The pigments that constitute the hair colorants of the present invention and that are not harmful or [are only] slightly harmful to the human body are lower-toxicity organic pigments for coating materials or the dyes prescribed in "Ministerial ordinance for coal tar colors for use in pharmaceuticals" permitted by the Ministry of Health and Welfare.

The examples of the pigment include (A) carbon black, (B) organic pigments composed of yellow pigments such as Azo Yellow, Condensed Azo Yellow, tetrachloroisoindolinone yellow, and vat yellow; orange pigments such as Azo Orange, genzimidazolone orange, and Vat Orange; blue pigments such as copper phthalocyanine blue, and Indanthrone Blue; green pigments such as copper phthalocyanine green; red pigments such as Soluble Azo Red, Insoluble Azo Red, quinacridone, and perylene; purple pigments such as Thioindigo and dioxazine violet, and (c) those listed in the Ministerial ordinance as tar pigments that can be

used in pharmaceuticals and as tar pigments for cosmetics, [Japan] Red 2,3,102, 103, 104, 105, 106, 201, 292, 203, 204, 205, 206, 207, 208, 213, 214, 215, 218, 219, 220, 221, 223, 225, 227, 228, 229 404, 405, 501, 502, 503, 504, 505, and 506; [Japan] Yellow 4, 5, 201, 202, 203, 204, 205, 401, 402, 404, 405, 406, and 407; [Japan] Orange 201, 201, 205, 206, 207, 401, 402, and 403; [Japan] Green 2, 3, 201, and 202; [Japan] Purple 1 and 201, [Japan] Brown 201; and [Japan] Blue 2, 201, 202, 203, 205, 403, and 40; one or a combination of these pigments can be used and in some cases, binders that are often used in xerographic copiers can be added, such as high-molecular-weight polymer, e.g., polystyrene, silicone resin, polymethyl acrylate, polymethacrylic acid, and copolymers of acrylic acid and α-acrylic acid ester derivatives, polyvinyl [derivatives], copolymers of vinyl chloride, vinyl acetate, cellulose esters, ethylcelluose, and nitrocellulose, hardeners selected from urea resins, melamine resins, phenolic resins, and epoxy resigns, and perfumes can be added as ingredients. The smaller the particle size of the colorants, the better it is for the particles to adhere along the uneven [surface] of the hair cuticle, however, for maintaining a desirable flow, it is preferable that the particle size is 0.03-20 μm, more preferably 0.1-10 μm to obtain good results.

For an apparatus for negatively charging the above-mentioned pigments, and then propelling them onto the human head, a known electrostatic coating apparatus can be used, which is composed of an ignition electrode for charging a pigment and a grip unit insulated with a material having insulation resistance greater than that of air, such as polytetrafluoroethylene, polyvinyl chloride, and polyester, the grip unit connected to the ignition electrode.

In the present invention, any of the uniform-electricity type, constant-voltage type, and constant-current-type electrostatic coating apparatus can be used, however, the constant current-type electrostatic coating apparatus is safe and does not produce color spots, therefore it is most preferable. Next, a method for dyeing hair using such an apparatus and the hair colorant of the present invention will be explained using figures.

First of all, a comb that can positively charge hair (1) is used to brush the hair for a while. For the materials that can be used to make combs that positively charge hair (1) include genuine gold, ebonite, polytertrafluoroethylene (trade name: Teflon), aluminum, polyvinyl chloride, polyethylene, polyester, chromium, etc.; however, from the viewpoint of easy charging and availability, aluminum, polyvinyl chloride, ebonite, polyterafluoroethylene combs are preferable. There is no limit to the shape of the combs, therefore a common comb can be used; however, when coarse-tooth combs and very short-tooth combs are used, the teeth of the combs do not contact the hair sufficiently. On the contrary, when a fine-tooth comb is used, the combing is not smooth so the percentage of the contact of the teeth of the comb with the hair becomes small within a fixed period of time, therefore the amount of charging is insufficient, which is undesirable. Generally speaking, it is preferable that the length of the teeth of the comb is about 3 cm and the distance between the teeth is 1-1.5 mm. Others such as hair brushes made of the above-mentioned materials used in barber shops and beauty salons also can be used.

Next, classified methods will be explained for coating colorants utilizing propellant force or electrostatic attractive

force between the positively charged hair and negatively charged pigment.

(A) Uniform electricity method: As shown in Figure 1, after an mount of electricity which does not bring about natural electric discharge (in the case of this colorant, it is about 6×10^{-7}C is stored in a capacitor (750 pf) (4) with the switch (3) turned off (closed) then either a dryer handgun method shown in Figure 1 (a) or spray method (b_1) (b_2) for people wary of insulation, is used to apply the electrostatic powder coating technique for dyeing hair. The dye (pigment) as is, or in some cases dissolved in n-hexane or ethanol to obtain good fluidity, is then put in the apparatus (5), and if spraying is used, it is stored with a liquefied gas or compressed gas in the apparatus (6) and under insulation with an insulating material (s). The dye (pigment) passes through a precharged region to charge it negatively, and the above-mentioned charged particles (7) are propelled vigorously from apparatus (5) or (6), which is 5-15 cm from the hair (1), by the electrostatic force and/or propellant force, and are adhered and fixed strongly on and in the vicinity of the positively charged region of hair (1), thereby the hair can be dyed.

In addition to the above-mentioned type, by using a colorant-particle-feeding apparatus (8) utilizing a probe electrode as shown in Figure 2 and using a handgun equipped with a charging apparatus (9), hair dyeing can be carried out like using a hand dryer.

In addition, as shown in Figure 3, in:

(B) Constant current method: A compressed gas (G) with a fixed pressure is fed, the propelling of the colorant (12) on the fine-mesh net (11) is controlled by the knob of the handgun (13)

and through the ignition electrode (14) which is connected to a small constant-current power source circuit (15) (which can feed 1-10 mA stably the colorant is positively charged, and is propelled by electrostatic attractive force and the pressure of the compressed gas, thereby it strongly adheres to the hair mainly by electrostatic force.

At the present time, from the viewpoint of safety and absence of colored spots, the constant-current method is superior.

Moreover, instead of the colorant of the present invention, by using a sprayer containing a hair spray, not only hair dyeing but also hair spraying can be carried out.

As stated in detail above, if the hair colorant of the present invention is used to dye hair, the hair and colorant are attracted electrically, therefore it is difficult for air layers to form, the colorant can adhere to the hair uniformly, no spots can be formed on the hair and the colorant, once adhered to the hair, comes off only with difficulty. Accordingly, it is unnecessary to use a large amount of colorant, therefore the hair does not become bulky, and natural hair without the feeling of physical discomfort can be obtained. Moreover the combing of hair is smooth and the original beauty of the hair can be maintained.

Application Example 1

Dried hair was "loosened" for 1-2 min with an aluminum comb. After the hair was sufficiently positively charged, the switch of the spray apparatus described in detail above was turned on, 800 V were applied, 6×10^{-7} C of electricity were stored in a capacitor, then the dye was sprayed onto the hair for about

10 sec with a colorant composed of 2 g of carbon black (particle size: 1-3 μm), a small amount of perfume, and 1.6 g of N_2 gas (5 atm) sealed in a vessel from a distance of 10 cm from the hair. Five minutes after the spraying, the hair was set in a suitable style and the results were such that the hair was not bulky, it was easy to comb and beautifully dyed. If the hair was additionally heated about 50°C for 1-2 min utilizing the thermosetting characteristics of some resins, hair which was as flexible as rubber [sic] can be obtained.

Application Example 2

Hair dyeing was conducted as in Application Example 1 except that a colorant composed of 2 g of Indanthrone Blue (particle size 0.1 μm), a small amount of perfume, and 1.6 g of N_2 gas (5 atm) was used. As in Application Example 1, the results were such that the hair was not bulky, it was easy to comb and beautifully dyed.

Application Example 3

Hair dyeing was conducted as in Application Example 1 except that a colorant composed of 2 g of [Japan] Brown 201 (4-p-sulfophenylazo-2-(2,4-xylylazo)-1,3-resorcinol) (particle size: 0.2 μm), a small amount of perfume, 1.6 g of N_2 gas (5 atm), and 80 g of resin was used. As in Application Example 1, the results were such that the hair was not bulky, it was easy to comb and beautifully dyed.

Applicant Example 4

1 g of carbon black (particle size: 0.2 μm), 1 g of tar pigment [Japan] Red 502 which could be used according to the ordinance of the Ministry of Health and Welfare, 0.5 g of [Japan] Yellow 407, and a small amount of n-hexane were added to improve the fluidity, and then it was set at the position 12 of a constant-current apparatus shown in Figure 3. After the hair was positively charged using a comb, and improved electrostatic powder coating apparatus 13 was used for dyeing the hair. The hair was dyed in a short time and the adhesion of the dye to the hair was much stronger than when conventional sprayers were used.

Brief description of the figures

Figures 1, 2, and 3 show an overview of an apparatus for hair dyeing using the colorants of the present invention. In Figure 1 b_1 is the front view of the spray apparatus and b_2 is the side view of the apparatus.

Explanation of the symbols

1: Hair, 2: Comb, 3: Switch, 4: Capacitor, 5,5,13: Apparatus for storing colorant, 7: Charged particles, 8: Apparatus for feeding particles, 9,14: Charging apparatus, 15: Small constant-current power source circuit, s: Insulator.

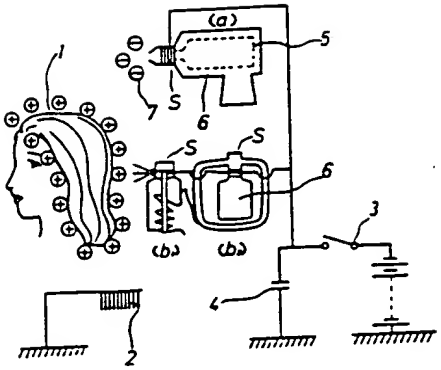

Figure 1

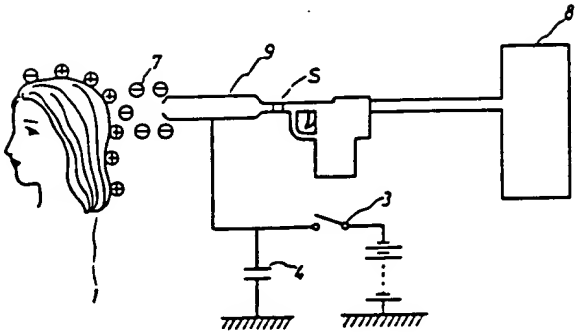

Figure 2

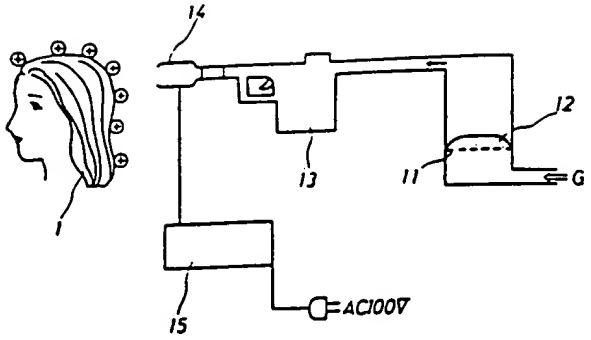

Figure 3